Space Weather Forecast

Issued on Wednesday, 17 August 2022 at 13:15 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

---

Space Weather Forecast Headline: G1/Minor storm likely Days 1 and 2 (17-18 Aug), chance of G2/Moderate storm. Further Moderate flares (R1-R2 Radio blackouts) likely throughout.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity is Moderate with one Moderate-class flares in the last 24 hours. This was from a relatively complex region in the southwest quadrant. There are currently ten sunspot regions on the visible disc. The region mentioned above is the largest and most active region and is displaying strong spots with magnetic complexity. The next largest region is near north centre disc, but continues to appear relatively stable. A sunspot region in the northeast has grown rather quickly and was responsible for a near-Moderate class flare at 17/0820 UTC. Three regions are approaching the west limb, with another couple of weak regions becoming visible in the southeast. Most other regions appear largely small and stable for now.

A CME (Coronal Mass Ejection) associated with one or more flares in short-succession from the largest sunspot region on the 16th has been analysed and may give a glancing blow to Earth on the 19th, though the bulk of the ejecta appears to pass below Earth. The Moderate-class flare late on the 16th does not appear to have produced a CME based on available LASCO and STEREO imagery. The more recent near-Moderate class flare may also have produced a CME but we await further imagery to assess this.

Solar Wind / Geomagnetic Activity: The solar wind was at slow-ambient levels for much of the period, varying between 350-380km/s. An increase to slightly elevated levels was observed following the arrival of a CME just after 17/0200 UTC and solar winds now 450-480 km/s. The Interplanetary Magnetic Field was weak to start, increasing to Moderate levels after 17/0200 UTC. The north-south component varied weakly to begin with but with the CME arrival has varied between moderately positive and negative, though has mainly been positive. Geomagnetic activity was Quiet to Unsettled (Kp 0-3).

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is likely to be Moderate with a slight chance of High levels. The most likely source region for any larger flares would be from the larger magnetically complex region in the southwest quadrant.

Solar Wind / Geomagnetic Activity: The combined effect of one or more CMEs that left the sun on the 16th August may give a glancing blow at Earth either late on the 18th (Day 2) or early on 19th (Day 3). Solar winds are currently at slightly elevated levels. Later on Day 1 (17th) Earth is expected to connect with the high speed stream from a coronal hole. Wind speeds are likely to reach elevated levels at around 500-600km/s. Solar winds are expected to remain enhanced through much of this period before perhaps declining somewhat through Day 4 (20th).

Geomagnetic activity is expected to be mainly Quiet at first. During Day 1, activity is expected to

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

© Crown Copyright 2022. All Rights Reserved.

become Active to G1/Minor Storm, with a chance of G2/Moderate Storm and a very slight chance of G3/Strong Storms. A gradual decline in activity is expected through Day 4.

Energetic Particles / Solar Radiation: Solar radiation storms are unlikely, but there is a slight chance of an S1 or greater event. This is mainly due to the more complex region which is now in the western hemisphere of the Sun, where any proton events are more likely to reach Earth.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	70	50	40	5
Strong	G3	No	5	3	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	60	60	60	50
Very Active	R3 to R5 X	No	10	10	10	10

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

© Crown Copyright 2022. All Rights Reserved.

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	No	10	15	15	15
Very Active	**≥ S3 ***	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

© Crown Copyright 2022. All Rights Reserved.